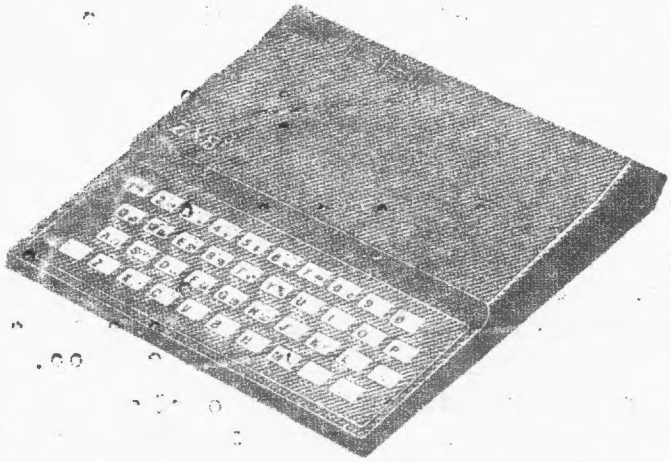
2-1

SINC-LINK



TIMEX-SINCLAIR USERS CLUB

NEWSLETTER

Toronto, Ontario

PRINTED IN CANADA

B6146

A MESSAGE FROM THE PRESIDENT

Happy New Year TIMEX SINCLAIR USERS!

This is the first issue of the club's Newsletter under the guidance of our chief contributor and chief machine code expert, Stan Piotrowski. Looks great so far, Stan! Keep up the good work.

Starting the new year with the best intentions, the executive comittee plan to bring new ideas and activities to the club. Basic instruction and demostrations of hardware & software packages that are being used by the members of our club.

As always is the case with all co-operative organizations, I call on all our members to support our efforts and make any suggestions that you feel will improve club activities.

I look forward to seeing and hearing from all our members in 1984.

Greg Lloyd
President

Message From The Newseditor

This is your Newsletter and all contributions will be appreciated. From the brand new programmer to the experienced one...remember that at one time all the more experienced programmers were brand new too.

All submissions should be typed double spaced since I have to retype the article. If any diagrams are included, they must be on a separate page with the proper labels (e.g. fig. 1, etc.).

Regular club members can give the articles to me at the meetings and the out-of-towners can mail it to our club post office box.

In this and the following newsletters, I will have articles for the Basic Programmer and the Machine Code Programmer. Also included will be other little tidbits that you can incorporate into your programs.

Stan Piotrowski
Newseditor

The following are the executive officers of our club and their term of office will be until June 1984.

President: Greg Lloyd
Treasurer: John Roach
Secretary: George Chambers
Librarian: Martin Mauk
News Editor: Stan Piotrowski
Activity Directors: Brian Hammond & Ian Roberts
Meeting Chairman: Harold Goodwin
Out of Town Members: Chris Hart

POOR MAN'S FASTLOAD

by C. Goudeseune

Have you ever noticed what a ZX81 program sounds like near the end? There are 25 bursts of noise with periods of steady tone in between. The reason for this is the manner in which the ROM saves the programs-it copies almost the entire RAM up to the system variable E-LINE. Therefore, the last major item to be saved is the Display File (D-File), consisting of 25 Newlines (the noise) separated by 24 lines of 32 spaces (the steady tone). This is always so because the ZX81 clears the screen before performing any command, including the SAVE.

All these spaces are, of course, completely redundant as far as the program is concerned. A simple way to eliminate them is by adding the following lines to your program:

```
9996  FOR I=1 TO 24
9997  SCROLL
9998  NEXT I
9999  SAVE "program name"
```

To save, type FAST, N/L, RUN 9996, start the tape recorder recording and hit Newline. The reason that the display file seems to disappear is the SCROLL's command operation. When the ROM executes this statement, it clears the bottom line of spaces. This line is truly empty, consisting of only a Newline character without the normal row of spaces. Doing this 24 times empties the whole screen, and the SAVE command in the program executes without first 'clearing' the screen full of spaces again. The FAST statement eliminates the boring wait for the ROM to refill the screen.

This technique is most useful in short programs, as it reduces the loading time by about 10 seconds. In programs approaching 16K in length, 10 seconds makes little difference in 5 or 6 minutes. Of course, this technique will not work with an unexpanded ZX81 or TS1000, because the ROM already performs the screen-emptying as a matter of course to conserve memory. I do not know exactly how QSAVE and the other fastload programs in the library work, and this technique may not be compatible with them.

BASIC PROGRAMMING

Beginning with this article, we will begin using those commands you've learned and apply them to a program. There are many programs in our library that are broad and general and may not be quite suitable to your particular needs and after completing these series of articles, you should be able to customize your own programs. This program is a Data Base program (or D-Base in computer terminology). You have the main program and then you add your own data such as a name & address list or a cheque-book account or a household inventory file. The following program will be a name and address type D-Base. Each and every D-Base program has the same "skeleton" program and you can add the various needed program lines as you wish. Game-type programs are really best left to machine code since it is a lot faster and not so boring.

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MENU

After entering many programs I use the following technique. The main Menu always begins at line number 100 and all the routines are located at lines 1000, 2000, etc.

The main menu is the starting point of any program which allows the user to branch off into a choice of operations to be performed. Whenever I start off, I decide what I want in my program and what it should do so lets start off with the menu:

```
100  FAST
110  CLS
120  PRINT AT 3,6;"NAME/ADDRESS FILE"
130  PRINT TAB 6;"17 graphic 7's"
140  PRINT,,TAB 8;"1. ADD"
150  PRINT TAB 8;"2. DELETE"
160  PRINT TAB 8;"3. SORT"
170  PRINT TAB 8;"4. LIST"
180  PRINT TAB 8;"5. SEARCH"
190  PRINT TAB 8;"6. SAVE"
200  PRINT,,TAB 7;"ENTER A NUMBER"
210  SLOW
220  IF INKEY$ < "1" OR INKEY$ > "7" THEN GOTO 220
230  GOTO 1000*VAL INKEY$
```

Explanation: line 140 has 2 commas after the PRINT statement. Remember that 1 comma is a TAB 15 so 2 commas is TAB 31 and the next printed word will be again at TAB 0 resulting in a space inserted between line 130 and 140. This saves typing time and memory. Line 220 is the INKEY$ function. The computer acts immediately to the keyboard entry. You could have typed INPUT Z$ but this takes 2 keyboard entries (entering a number then N/L). Therefore, if you type anything else other than a number between 1 and 7 the computer goes back to 220 to wait for the proper response. This is what is known as idiot-proofing the program. Line 230 is what is know as a "computed GOTO" The computer multiplies your response times 1000. Also note we used "VAL". Your response is an INKEY$ function which is a string function. Since the computed GOTO is a mathematical function your response has to be translated into a real number which is the function of VAL.

ADD Data to File

Before we proceed with this section, there are other program lines we must enter in order for this menu option to work. Enter the following lines and they will all be explained.

NOTE: Line 220 uses firstly, the "less than" sign, then the "greater than" sign.

```
9000 DIM R$(50,88)
9010 DIM N$(26)
9020 DIM A$(23)
9030 DIM T$(20)
9040 DIM C$(7)
9050 DIM P$(12)
9060 DIM W$(88)
9070 DIM S$(26)
9100 LET N=0  (zero not the letter O)
9110 LET L$="------------etc." 32 dashes
9200 GOTO 100
```

Also add: 10 GOTO 9000

In order to be able to add data to a Data Base file, we must first dimension all variables. In line 9000 R$ will hold all the files or records about to be entered so in the above case we have set aside a space in memory for 50 records containing up to 88 characters. This means you have reserved 4400 bytes of memory (50*88=4400). The remaining dimensions are for the Inputs for entering data so that no entry can exceed the allowed limits. For example, N$ is dimensioned to 26. If a name is longer than 26 characters, only the first 26 will be entered. The same goes for the others (except W$ and S$) If you add them all up your answer will be the allowed characters for R$ (26+23+20+7+12=88). If possible, always try to have the variables represent their inputs. For example, N$ is used for Name, C$ is used for postal Code, etc. W$ is used for the sorting routine and S$ is used for the searching routine.
N is used for the counter number to keep track of the records currently on file.
By letting L$ = 32 dashes, anytime we need 32 dashes in the program we simply type: PRINT L$. This will save a lot of memory if used more than once.

NOTE: Don't forget to SAVE your program often since the ZX81 likes to 'crash' a lot.

Now that the DIM of R$ is explained, you may be wondering why then only 50 records? It is possible to change it to a higher number but it all depends on how much memory you have left after the whole program is entered. A simple test is to change 50 by adding increments of 10 until you get an error message of 4/9000 which means you have run out of memory. Subtract 10 from your trial record number R$ but remember the more records you have, the longer it takes to save or load. Also, if you have QSAVE then a set amount of memory is reserved above RAMTOP.

For now, add the following lines to the program to ensure your data will not be corrupted. (They will all eventually be changed to their proper line commands.)

```
1000 STOP
2000 STOP
3000 STOP
4000 STOP
5000 STOP
6000 STOP
7000 STOP
```

The following are the 'Add data to record' lines:

```
1000 FAST
1010 CLS
1020 LET N=N+1
1030 IF N>51 THEN GOTO 9600
1040 PRINT,,,,"ADD NEW RECORD TO FILE NO. ";N
1050 PRINT L$
1060 PRINT,,,,"NAME: (SURNAME FIRST)"
1065 SLOW
1070 INPUT N$
1080 PRINT AT 6,6;n$
1090 PRINT,,"ADDRESS: ";
1100 INPUT A$
1110 PRINT A$
1120 PRINT,,"CITY/TOWN: ";
1130 INPUT T$
1140 PRINT T$
1150 PRINT,,"POSTAL CODE: ";
1160 INPUT C$
1170 PRINT C$
1180 PRINT,,"PHONE NUMBER: ";
1190 INPUT P$
1200 PRINT P$
1210 PRINT,,,,TAB 6;"ALL CORRECT (Y/N)"
1220 IF INKEY$="N" THEN GOTO 1300
1230 IF INKEY$="Y" THEN GOTO 1500
1240 GOTO 1220

1300 FAST
1310 CLS
1320 PRINT AT 8,6;"RECORD ";N;" CANCELLED"
1330 PRINT,,,,TAB 9;"PRESS AKEY"
1340 PAUSE 4E4
1350 LET N=N-1
1360 GOTO 1000

1500 FAST
1510 CLS
1520 LET R$(N,1 TO 26)=n$
1530 LET R$(N,27 TO 49)=A$
1540 LET R$(50
1540 LET R$(N,50 TO 59)=T$
1550 LET R$(N,70 TO 76)=C$
1570 LET R$(N,77 TO 88)=p$
1580 PRINT AT 8,3;"ADD ANOTHER RECORD (Y/N)"
1590 PAUSE 4E4
1600 IF INKEY$="Y" THEN GOTO 1000
1610 GOTO 100
```

Let's go through the logic in this part of the program. First of all, the record number must be incremented by 1. Since we allowed only 50 records to be entered, it is checked in Line 1030. If the record numbers (N) is less than 51, the program continues; otherwise it will print "FILES FULL" message.
The surname is entered first for searching or sorting routines. Since humans are prone to typing mistakes (like in this Newsletter), Line 1210 checks with you for correctness. If it is not correct, it reduces the record number by 1 then goes back again to entering the data. Notice that correctness checking is done only after all the lines have been entered.

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It can be done after each entry or you can add program lines to change any of the entries but remember all those extra lines uses memory and reduces the amount of records you can add.

If everything is correct the program continues at 1500. This is where the Inputs are entered into R$. The characters from 1 to 26 will be R$(N); if N=1 (your first entry), then N$ will become R$(1,1 to 26). Note that N$ was dimensioned to 26 characters. After adding a record, if you press BREAK you can check by direct command all or part of R$. e.g. PRINT R$(1) will print all of record #1 or PRINT R$(1,1 TO 26) will print the name you have entered. A routine later on will actually do this for us.

LIST THE FILE

```
4000 FAST
4010 CLS
4020 LET I=1
4030 PRINT "NO."; TAB 9;"NAME"
4040 PRINT L$
4050 PRINT I;TAB 8; R$(I,1 TO 26)
4060 LET I=I+1
4070 IF I> N THEN GOTO 4400
4080 IF PEEK 16442> 4 THEN GOTO 4050
4085 PRINT AT 21,0;"C=CONTINUE, P=PRINTOUT, M=MENU"
4090 PAUSE 4E4
4100 IF INKEY$="P" THEN GOTO 4200
4110 IF INKEY$="C" THEN GOTO 4300
4120 IF INKEY$="M" THEN GOTO 100
4130 GOTO 4090

4200 COPY
4210 GOTO 4090

4300 CLS
4310 GOTO 4030

4400 PRINT AT 20,4;"NO MORE RECORDS ON FILE"
4410 GOTO 4080
```

The above routine will List all the present records on ffle. The next Newsletter will explain the above routine and continue with the other options available in the menu.

For now, line 4080 will be explained. The system variable address 16442 holds the present line number of the characters printed starting with an empty screen, the address will hold the value 24. (the ZX-81 can print on 24 lines). Evertime a line is filled, the number is decreased by 1. If 20 lines of data have not been yet printed (if the data is available), the program continues until 20 lines are printed and then moves down to line 4085 where the options are printed.

Hopefully, the above program so far will have given you some insight to Basic Programming, the use of various commands, and some knowledge of D-Base programs.

...

COLLECTION OF TIDBITS

If you find your programs becoming longer and using up too much memory, go through it and anytime you find numbers repeated more than 3 times, then let those numbers= a variable. For example, you may have typed a PRINT TAB 6 (or 8 in the previous program); then let 8=a variable (LET A=6). This serves 2 purposes: a number takes 5 bytes plus each number following. e.g. 567 takes 7 bytes. If repeated 10 times, then that is 70 bytes used whereas A=1 byte only. Another reason is that say TAB 6 is not right. You then have to go through each line changing the 6's to whatever the right TAB number is. By changing the LET statement, you will have then automatically changed all the TAB numbers.

In the slow mode, have you noticed that everytime there is a PAUSE statement, the screen flickers? A much smoother waiting time is a FOR/NEXT loop.
e.g. instead of PAUSE 500 use :
XXXX FOR I=1 TO 500 (X's are line numbers)
xxxx NEXT I

INPUTS PRINTED IN INVERSE

In some of your programs, you may want all the Inputs to be printed in inverse. For example, Enter the name of your file: and the next line of course will be
XXXX INPUT N$ (XXXX is your line number)
The following program prints the normal Input and then the inverse of your Input.

```
10 INPUT Y$
20 PRINT AT 10,0;Y$
30 FOR I=1 TO LEN Y$
40 LET X=CODE Y$(I) +128
50 LET Y$(I)=CHR$ X
60 NEXT I
70 PRINT Y$
```

Line 30 sets up the FOR/NEXT loop the length of your Input. If your Input was "HELLO", then the loop will be 1 TO 5 since "hello" is 5 characterslong. Line 40 is where the actual inverse takes place. The code of each letter has 128 added to it. If you check in the back of your manual, you will see that the code for "H" is 45. When 128 is added, the new code is 173; looking at the code for 173 is Inverse "H" The loop continues until all the inputed characters are inversed then prints it.

MACHINE CODE PROGRAMMING

In some machine code programs you may have disassembled you will have noticed the uses of the OR, AND, XOR, RES, BIT, etc. The uses of these machine code commands are explained in other machine code books so I will only touch on it slightly. In order to use these commands, you must be aware of the binary digits of each code (0 to 255). The last page of this newsletter will have the three most used counting features... decimal, hex, and binary.

Each binary code is made up of 8 digits and are counted from right to left with the first digit being 0. For example, the code for the letter "H" is 45. If you check the binary number for 45, you have: 0010 1101. BIT 0 is 1, etc. to BIT 7 is 0. If you change BIT 7 to a 1, the letter "H" is inversed. Check the new binary digit and you will see that the new binary number is 1010 1101 which is code 173. Checking in your manual, you will find that code 173 is inverse "H". The ZX-81 uses this fact when printing the commands in Basic. Parts of the ROM are tables of the commands and when the subroutine in the ROM goes to print the command word, it checks BIT 7. If it is 0, it continues to print each letter until it finds the seventh BIT to be a 1 and stops printing the command word. For example, the Basic command word "PRINT" will have the first 4 letters in normal mode in the command table but the "T" will be inversed. The routine then stops printing the command word, changes the inverse to normal and returns the keyboard to the user. Therefore, if your are entering a machine code program that will contain tables, this is the fastest and most efficient use of machine code.

I am presently writing a machine code disassembler program that makes use of the above routine. For example, the mnemonic instruction for code 205 is "CALL". The subroutine goes to the word table where 'call' is located and prints the word checking BIT 7 each time until it finds that it is a 1 then stops printing the word. The routine IS long and tedious (like any machine code routine) but it can do all this and fill the screen in less than 1 second since machine code is very, very fast.

Whenever I come across a machine code routine, I may find some parts of the routine interesting or useful in other routines. If you have Toni Bakers's book on "MASTERING MACHINE CODE ON YOUR ZX81", check the games out line by line and you will discover how to use the keyboard scan routine, or routine which I found useful in 2 different programs. One routine decreases a score to zero and another increases a score indefinately. Take out these routines and check the logic in them and how they are used. The following is how numbers can be increased by one which in machine code is very fast. Another useful feature of this program is how fast machine code cycle is. In about 1 second, it has checked, compared and printed about 1000 numbers. Try that in Basic!!!

First of all, I will give you the program in Basic then the machine code routine.

```
10 LET A=1
20 PRINT AT 10,14;A
30 LET A=A+1
40 GOTO 20
```

Now the machine code routine....
First, enter a REM statement with 35 characters (such as 35 X's. You can enter more if you like but this is a waste of memory).

Now enter the machine code loader program. For those of you don't have a loader program, the following is a machine code loader program:

```
1 REM XXXX...etc  (35 X's)
10 LET A=16514
20 INPUT B
30 POKE A,B
40 SCROLL
50 PRINT A;",";PEEK A
60 LET A=A+1
70 GOTO 20
```

RUN and ENTER the following bytes: (1 at a time)

```
42,12,64              LD HL, (16396)   :display file
                                        location
17,124,1              LD DE, 381       :screen centre
25                    ADD HL,DE
126          CHECK    LD A,(HL)        :A contains the
                                        character at
                                        that location
254,0                 CP 0             :is it blank?
32,2                  JRNZ +2          :No. It contains
                                        a number so jump
                                        forward 2 bytes
62,28                 LD A,28          :Yes. A now contains
                                        the zero digit
60                    DEC A            :LET A=A-1
254,38                CP 38            :is A larger than
                                        the code for
                                        digit "9"?
32,5                  JRNZ +5          :No. Jump ahead
                                        5 bytes
54,28                 LD (HL),28       :Yes. Print a
                                        zero
43                    DEC HL           :move display
                                        back 1 space
24,239                JR -17           :jump back 17
                                        bytes to CHECK
119                   LD (HL),A        :print the digit
                                        A contains
205,187,2                CALL 699      :keyboard scan
62,255                LD A,255
189                   CP L             :check for no
                                        key pressed
202,130,64            JP Z, 16514      :if a key is
201                   RET              pressed, return
                                        to Basic & stop.
```

DECIMAL	HEX	BINARY
0	00	00000000
1	01	00000001
2	02	00000010
3	03	00000011
4	04	00000100
5	05	00000101
6	06	00000110
7	07	00000111
8	08	00001000
9	09	00001001
10	0A	00001010
11	0B	00001011
12	0C	00001100
13	0D	00001101
14	0E	00001110
15	0F	00001111
16	10	00010000
17	11	00010001
18	12	00010010
19	13	00010011
20	14	00010100
21	15	00010101
22	16	00010110
23	17	00010111
24	18	00011000
25	19	00011001
26	1A	00011010
27	1B	00011011
28	1C	00011100
29	1D	00011101
30	1E	00011110
31	1F	00011111
32	20	00100000
33	21	00100001
34	22	00100010
35	23	00100011
36	24	00100100
37	25	00100101
38	26	00100110
39	27	00100111
40	28	00101000
41	29	00101001
42	2A	00101010
43	2B	00101011
44	2C	00101100
45	2D	00101101
46	2E	00101110
47	2F	00101111
48	30	00110000
49	31	00110001
50	32	00110010
51	33	00110011
52	34	00110100
53	35	00110101
54	36	00110110
55	37	00110111
56	38	00111000
57	39	00111001
58	3A	00111010
59	3B	00111011
60	3C	00111100
61	3D	00111101
62	3E	00111110
63	3F	00111111
64	40	01000000
65	41	01000001
66	42	01000010
67	43	01000011
68	44	01000100
69	45	01000101
70	46	01000110
71	47	01000111
72	48	01001000
73	49	01001001
74	4A	01001010
75	4B	01001011
76	4C	01001100
77	4D	01001101
78	4E	01001110
79	4F	01001111
80	50	01010000
81	51	01010001
82	52	01010010
83	53	01010011
84	54	01010100
85	55	01010101
86	56	01010110
87	57	01010111
88	58	01011000
89	59	01011001
90	5A	01011010
91	5B	01011011
92	5C	01011100
93	5D	01011101
94	5E	01011110
95	5F	01011111
96	60	01100000
97	61	01100001
98	62	01100010
99	63	01100011
100	64	01100100
101	65	01100101
102	66	01100110
103	67	01100111
104	68	01101000
105	69	01101001
106	6A	01101010
107	6B	01101011
108	6C	01101100
109	6D	01101101
110	6E	01101110
111	6F	01101111
112	70	01110000
113	71	01110001
114	72	01110010
115	73	01110011
116	74	01110100
117	75	01110101
118	76	01110110
119	77	01110111
120	78	01111000
121	79	01111001
122	7A	01111010
123	7B	01111011
124	7C	01111100
125	7D	01111101
126	7E	01111110
127	7F	01111111
128	80	10000000
129	81	10000001
130	82	10000010
131	83	10000011

DECIMAL	HEX	BINARY
132	84	10000100
133	85	10000101
134	86	10000110
135	87	10000111
136	88	10001000
137	89	10001001
138	8A	10001010
139	8B	10001011
140	8C	10001100
141	8D	10001101
142	8E	10001110
143	8F	10001111
144	90	10010000
145	91	10010001
146	92	10010010
147	93	10010011
148	94	10010100
149	95	10010101
150	96	10010110
151	97	10010111
152	98	10011000
153	99	10011001
154	9A	10011010
155	9B	10011011
156	9C	10011100
157	9D	10011101
158	9E	10011110
159	9F	10011111
160	A0	10100000
161	A1	10100001
162	A2	10100010
163	A3	10100011
164	A4	10100100
165	A5	10100101
166	A6	10100110
167	A7	10100111
168	A8	10101000
169	A9	10101001
170	AA	10101010
171	AB	10101011
172	AC	10101100
173	AD	10101101
174	AE	10101110
175	AF	10101111
176	B0	10110000
177	B1	10110001
178	B2	10110010
179	B3	10110011
180	B4	10110100
181	B5	10110101
182	B6	10110110
183	B7	10110111
184	B8	10111000
185	B9	10111001
186	BA	10111010
187	BB	10111011
188	BC	10111100
189	BD	10111101
190	BE	10111110
191	BF	10111111
192	C0	11000000
193	C1	11000001
194	C2	11000010
195	C3	11000011
196	C4	11000100
197	C5	11000101

DECIMAL	HEX	BINARY
198	C6	11000110
199	C7	11000111
200	C8	11001000
201	C9	11001001
202	CA	11001010
203	CB	11001011
204	CC	11001100
205	CD	11001101
206	CE	11001110
207	CF	11001111
208	D0	11010000
209	D1	11010001
210	D2	11010010
211	D3	11010011
212	D4	11010100
213	D5	11010101
214	D6	11010110
215	D7	11010111
216	D8	11011000
217	D9	11011001
218	DA	11011010
219	DB	11011011
220	DC	11011100
221	DD	11011101
222	DE	11011110
223	DF	11011111
224	E0	11100000
225	E1	11100001
226	E2	11100010
227	E3	11100011
228	E4	11100100
229	E5	11100101
230	E6	11100110
231	E7	11100111
232	E8	11101000
233	E9	11101001
234	EA	11101010
235	EB	11101011
236	EC	11101100
237	ED	11101101
238	EE	11101110
239	EF	11101111
240	F0	11110000
241	F1	11110001
242	F2	11110010
243	F3	11110011
244	F4	11110100
245	F5	11110101
246	F6	11110110
247	F7	11110111
248	F8	11111000
249	F9	11111001
250	FA	11111010
251	FB	11111011
252	FC	11111100
253	FD	11111101
254	FE	11111110
255	FF	11111111

Well, that's it fellow club members. Please accept my apologies for any typing errors that may have crept in. If there are errors, try and work out the proper or expected commands. In any case, a correction will be made in the next Newsletter.

Since I have just become the Newseditor, I have tried to have articles for the brand new programmer to the more experienced one. If you have any questions about a programming problem, chances are that others may be having the same problem, so feel free to submit these questions and if possible, an answer will be found to benefit all members.

By now you will have noticed that the format and Newsletter has changed from the previous ones. This is because of a cost savings to the club. Also, since I am new at this type of job, I am learning and with a bit of luck, the Newsletter will get better. I have no idea what type of articles or information you would like to see in your Newsletter so please pass this information to me and I will try to have them in future Newsletters.

Your News Editor,
Stan Piotrowski

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